

Johns Hopkins Consultative Medicine Essentials

for Hospitalists

www.JHCME.com

Management of Uncontrolled Pain

Grace A. Cordts, MD, MPH, MS,* and Sydney Morss Dy, MD, MSC†

*Assistant Professor, Johns Hopkins University School of Medicine, Division of Geriatric Medicine, The Johns Hopkins Medical Institutions, Baltimore, Maryland.

†Assistant Professor, Health Policy and Management, Health Services Research, Johns Hopkins Bloomberg School of Public Health, Johns Hopkins University, Baltimore, Maryland.

Instructions

This study activity consists of 5 sections. Each section starts with a clinical question followed by pertinent didactic content. Explanations are provided for each answer to help identify areas you may need to focus on and increase your overall knowledge of the topic; they are not part of the CME test.

To participate, read each question and select your answer. If the answer is incorrect, a red box will appear with the explanation. When you select the correct answer, a green box will appear with the explanation, followed by the didactic content. The didactic content will not appear until the corresponding question(s) has been answered correctly. You may want to select the wrong answers as well to see the explanation for why they are incorrect.

All questions need to be answered correctly to move to the CME post-test and evaluation.

Section 1. Pain Assessment

Which statement concerning pain assessment in hospitalized patients is MOST CORRECT?

A. Neuropathic pain is most often described as achy.

Incorrect. Neuropathic pain is more likely to be described as shooting pain.

B. Physicians and healthcare providers tend to underestimate pain in hospitalized patients.

Correct! Healthcare providers often underestimate pain in patients. This is a major cause of undertreated pain.

C. A patient's pain can be accurately determined by observation.

Incorrect. Patients often have severe pain without findings on physical examination. A patient's self report is the most accurate assessment of pain.

D. Patients who are unable to communicate verbally cannot be assessed for pain.

Incorrect. Several scales have been developed to assess pain in nonverbal patients.

Pain Assessment

Although almost all pain in patients can be controlled with the wide range of currently available treatments, 30% to 70% of terminally ill patients may be inadequately treated for pain.¹ Non-white patients and the elderly are at higher risk for uncontrolled pain.^{2,3}

Physicians often do not focus on pain management as a primary goal when they are working to diagnose, cure, or reduce the impact of disease. Potential consequences of inadequately treated pain include: a reduced quality of life; reduced functional status; social, familial, and financial difficulties; and requests for physician-assisted suicide.

The treatment of pain can be one of the most rewarding experiences a physician can have:

Few things a doctor does are more important than relieving pain. No patient should have to endure intense pain unnecessarily. The quality of mercy is essential to the practice of medicine: here, of all places, it should not be strained.⁴

Effective pain management requires a thorough pain assessment. Assessing pain descriptively is important for diagnosis and the development of an initial treatment plan whereas quantifying pain is essential for monitoring success of interventions. A physician would never assess a patient's blood pressure by judging how high it is from how he looks, treat knowing only that it was elevated, or be satisfied with the chosen treatment because the blood pressure was "improved" without knowing if the treatment goal was achieved—yet this is how pain is often managed.

Several guidelines have been developed for pain assessment, although most are focused on cancer pain.⁵⁻⁷ The most important step in all these guidelines is to believe that the patient's complaint of pain is real. Accustomed to the writhing associated with patients in acute severe pain, physicians sometimes assume that a patient who appears to be resting comfortably must have milder pain. However, when patients are in severe pain over days or weeks, continually demonstrating acute behaviors would be maladaptive. When treating a patient with advanced or terminal illness, asking the patient and believing his report is the most appropriate approach for controlling pain.

The key elements of a pain history can be remembered by using the mnemonic PQRST:

Palliating factors: What makes the pain better?

Provocative factors: What brings on the pain or makes it worse?

Psychosocial issues: Are there non-physical causes of pain, such as financial, social, or spiritual distress?

Quality of pain: Describe the pain (eg, sharp, dull, achy, burning, or shooting)

Radiation: Where is the pain (describe each location)? Does it travel anywhere? Are there risk factors for undertreatment of pain? (See Section 5: Barriers to Pain Control)

Severity: How bad is the pain right now? What is the worst pain you have had over the past 24 hours? Rate the pain on a scale from 0 (no pain) to 10 (the worst pain imaginable).

Treatment: What have you tried? Has it worked? What level did it bring the pain down to?

Timing: When does the pain bother you the most? How often does it occur? How long does it last?

Patients often have more than 1 type or site of pain. Each pain should be evaluated separately and treated. Failure to adequately identify all pain can lead to inadequate pain management.

The severity of pain should be evaluated using one of the published rating scales. Verbal patients can use a scale from 0 to 10, with 0 being no pain and 10 being the worst pain. Verbal patients can also use the none, mild, moderate, or severe pain scale. A visual 0 to 10 numeric scale can be used. Nonverbal patients can use the FACES scale (Figure 1).⁸

Figure 1. Faces Pain Scale - Revised



Evaluation of pain in individuals who are unable to report pain is difficult. There have been several scales developed using behavioral observations.⁹ One such scale, the Pain Assessment in Advanced Dementia (Table 1), uses 5 easily observable items to assess pain¹⁰; higher scores indicate worse pain. If patients have clear reasons for pain or are receiving treatments that would be painful in conscious individuals, they should be treated. If it is unclear whether the behaviors are due to pain or other causes, a trial of pain medication can be helpful. The quality of the pain may also be helpful in guiding treatment: shooting pain indicative of neuropathic causes, or colicky pain characterized by sharp bouts of abdominal pain, may respond to different types of pain medications. The pain assessment tools should also be used to evaluate treatment effectiveness.

Table 1. Pain Assessment in Advanced Dementia Scale

Items	0	1	2	Score
Breathing independent of vocalization	Normal	Occasional labored breathing. Short period of hyperventilation.	Noisy labored breathing. Long periods of hyperventilation. Cheyne-Stokes respirations.	
Negative vocalization	None	Occasional moan or groan. Low-level speech with a negative or disapproving quality.	Repeated troubled calling out. Loud moaning or groaning. Crying.	
Facial expression	Smiling or inexpressive	Sad. Frightened. Frown.	Facial grimacing	
Body language	Relaxed	Tense. Distressed pacing. Fidgeting.	Rigid. Fists clenched. Knees pulled up. Pulling or pushing away. Striking out.	
Consolability	No need to console	Distracted or reassured by voice or touch.	Unable to console, distract or reassure.	
				Total

Reprinted with permission from Warden et al. *J Am Med Dir Assoc.* 2003;4:9-15.¹⁰

A focused physical examination should be performed looking for any potential underlying causes for pain. A discussion of all potential causes of pain is beyond the scope of this module, but medical or oncologic emergencies or treatable syndromes, including fracture, infections, and bowel or bladder obstruction, should be considered and treated when consistent with patients' prognoses and goals of care.

Not all pain is the result of physical causes. It is important to address the nonphysical causes of pain, such as psychosocial, social, and spiritual suffering. A multidisciplinary approach with social workers, nurses, and chaplains is often helpful. Depression and many other symptoms also can interact with pain to worsen pain, and treatment of these symptoms can improve pain. Dame Cicely Saunders introduced the concept of "total pain" as a model of suffering that people with life-threatening illnesses can experience. The mnemonic PAIN (Table 2) can help to focus your assessment on all aspects of the causes of pain.¹¹ The National Comprehensive Cancer Network (NCCN) Adult Cancer Pain guidelines, which are available at www.nccn.org,¹² or the Education in Palliative and End-of-Life Care modules at <http://www.epec.net/EPEC/webpages/index.cfm> are useful resources.

Table 2 . Four Components of Total Pain

P	Physical problems, often multiple, must be specifically diagnosed and treated.
A	Anxiety , anger, and depression are critical components of pain that must be addressed by the physician in conjunction with other healthcare professionals.
I	Interpersonal problems including loneliness, financial stress, and family tensions, which are often interwoven in the fabric of a patient's symptoms.
N	Non-acceptance of approaching death, a sense of hopelessness, and a desperate search for meaning can cause severe suffering that is unrelieved by medications.

Reprinted with permission from Storey. *UNIPAC Three: assessment and treatment of pain in the terminally ill.* 2nd ed. Larchmont, NY: Mary Ann Liebert Inc Publishers; 2003.¹¹

Section 2. Principles for Treating Severe Pain

Mrs S is a 54-year-old woman with widely metastatic breast cancer. She is complaining of 8 out of 10 pain. She has been taking 5 mg of morphine orally every 4 hours previously with good pain relief. You give her a dose of 10 mg of morphine orally. Sixty minutes later you reassess her response. She says her pain is now 7 out of 10. Your most appropriate response is:

A. Try a dose of ibuprofen as an adjuvant.

Incorrect. The dose of morphine is insufficient because her pain decreased by less than 50%. More morphine, not a nonsteroidal anti-inflammatory drug (NSAID), is needed.

B. Wait another 60 minutes.

Incorrect. The pain should be improved by at least 50% by now.

C. Give an additional dose of 5 mg orally.

Incorrect. You should repeat the dose of 10 mg orally.

D. Give an additional dose of 10 mg orally.

Correct! The dose of morphine is insufficient. Her pain is decreased by less than 50%, therefore, you should repeat the dose of 10 mg orally. You repeat the dose every hour until pain is decreased by more than 50%. Once the pain score is decreased by 50% and is acceptable to the patient, consider that the effective dose and administer this every 4 hours with a breakthrough dose available. Alternatively, you can switch to the same daily total amount in a long-acting version. For example, if this patient required 4 repeat doses, then the effective dose would be morphine 50 mg orally every 4 hours with morphine 5 mg orally every hour as needed for breakthrough. Alternatively, the total daily dose would be $50 \times 6 = 300$ mg/day. Divided into 2 daily doses, that would be 150-mg long-acting morphine twice a day.

Principles for Treating Severe Pain

Severe pain is a medical emergency. Efforts to decrease severe pain should be prompt and continuous until pain is reduced by 50%. Although the literature on controlling severe pain comes primarily from the cancer literature, the principles also apply to non-cancer pain.

The World Health Organization recommends an effective 3-step approach to cancer pain management based on the severity of the pain (Figure 2).¹³ Stepwise movement through the ladder is not necessary. Severe pain requires immediate use of strong opioids. Patients in severe pain need rapid titration of pain medications. Table 3 outlines an initial approach based on the NCCN Adult Cancer Pain guidelines (www.nccn.org).¹² The starting dose is based on whether a patient is opioid naïve or already taking opioids.

Figure 2. World Health Organization's Pain Relief Ladder



Reprinted from World Health Organization (WHO). WHO's Pain Ladder. Available at: <http://www.who.int/cancer/palliative/painladder/en/>. Accessed November 30, 2007.¹³

Table 3. Sample Titration Schedule

Pain Intensity	Initial Treatment
7–10 (Severe or pain emergency)	Rapidly titrate short-acting opioid

- 5–10 mg of oral morphine or equivalent for opioid-naïve patient
- Reassess at 60 minutes
- If pain score unchanged, repeat or give double the dose
- If pain score decreased <50%, repeat same dose
- Once pain score decreased >50%, consider this the effective dose and administer this Q4h with breakthrough dose available
- For patients already on opioids, consider increasing dose by 50%–100% and titrating as above

Data from National Comprehensive Cancer Network.¹²

Oral medication can usually be used. In the hospital setting, initial treatment with a patient-controlled analgesia (PCA) or intravenous (IV) dosing can be effective to get severe pain controlled more quickly. Short-acting drugs are used for titration. The dose of opioid can be increased until pain is reduced or intolerable side effects occur. The dose is escalated every 60 minutes because morphine reaches its peak oral effect in approximately 60 minutes. If titrating with subcutaneous or IV medication, the peak effect is reached in 10 to 20 minutes and dose escalations occur every 20 minutes as needed. Breakthrough doses of narcotics are calculated at half of the 4-hour opioid dose or approximately 10% to 25% of the total 24-hour dose, but can be varied depending on the type of pain and what works best for the individual patient. Regular use of breakthrough doses (>1–2 times/day) should signal the physician to potentially increase the baseline dose. If the baseline dose is increased, an increase in the breakthrough dose may also be needed. Short-acting opioids can be converted to long-acting opioids after a stable dose is achieved. A systematic review of randomized controlled trials on dose titration for severe pain by Davis et al is available.¹⁴

There is no ceiling or maximum recommended opioid dose, except for meperidine. However, some adverse effects may be more common with higher doses over longer periods of time. If opioid doses are being titrated up and there is no clear relief of pain, consider whether the type of pain may be opioid-resistant (such as some neuropathic and pancreatic cancer pain) or whether there may be other etiologies of pain (such as spiritual distress).

Adjuvant drugs are drugs not normally thought of as pain relievers, but they have properties that improve pain control by enhancing analgesia of opioids by treating concurrent symptoms that exacerbate pain, or by providing analgesia for specific types of pain. Acetaminophen or NSAIDs are helpful to enhance the analgesic affect of opioids. Specific pain problems are responsive to specific adjuvants. Antidepressants, such as amitriptyline and nortriptyline, and anticonvulsants, such as gabapentin, are helpful in treating neuropathic pain.¹⁵⁻¹⁷ These drugs are more effective when used with opioids for severe pain, particularly because they usually need to be titrated up and have a longer onset of action. NSAIDs are indicated for pain associated with inflammation or bony disease. A trial of glucocorticoids also can be helpful in some types of inflammatory or bony pain or nerve compression. The reader is referred to Lussier et al¹⁸ for a detailed discussion of adjuvants.

Common errors in opioid management include:

- Incorrect dosing intervals: Immediate-release opioids should be dosed every 4 hours to start with (not every 6 hours as is frequently prescribed).
- Using as-needed timing instead of around the clock (standing) medications for constant pain: Constant pain will often require continuous medications. When starting a short-acting opioid for constant pain, consider giving it “around the clock” (the patient may refuse a dose if not needed) rather than “as needed” for constant, moderate-severe pain. Starting on a low dose of a long-acting opioid also can be an effective approach. Receiving more than 1 to 2 breakthrough doses in a 24-hour period is an indication that either a long-acting opioid should be started or the current dose should be increased.

- Titrating doses up too slowly: If 40 mg of furosemide had no response, a physician would not just increase to a 45-mg dose; she would increase the dose to 80 mg. Small, incremental titration of opioids are not appropriate either. An increase of at least 25% is needed to have an appreciable effect. If a patient is requiring frequent breakthrough medication, a safe approach is to add up the total opioid dose in the previous 24-hour period and convert it all to a long-acting opioid.
- Titrating up the long-acting opioid without increasing the breakthrough dose: Breakthrough doses should be approximately 10% to 20% of the 24-hour total opioid dose. Frequently, increasing the breakthrough dose to an adequate level can dramatically improve pain management.

Adverse effects of opioids are common but can usually be effectively managed. A history of adverse effects to opioid medications contributes to reluctance to receiving them again.

Key elements in minimizing adverse effects include:

- Careful history of opioid use and adverse effects. Many patients have had an adverse reaction to 1 opioid but can easily tolerate others.
- Many adverse effects (such as sedation) often wear off after a few days, and others (such as constipation) can usually be managed.
- Because patients may tolerate 1 class of opioids but not others, use the same opioid for long-lasting and breakthrough dosing whenever possible.
- For elderly patients with a history of adverse reactions or patients afraid of adverse effects, consider starting opioids at a lower dose (2.5–5 mg of morphine or equivalent).
- When continuous dosing is needed, use long-acting opioids. Constant blood levels may have fewer adverse consequences than fluctuations due to varying opioid doses.
- Opioid medications are not responsible for all symptomatology. Consider alternative causes. Adverse effects of other medications, the disease process, and comorbidities may mimic opioid adverse effects and require different management.
- Educate and support patients and families.
- Rotating opioids (different drug or route) may help.
- Significant adverse effects that are not manageable with these steps should lead to consideration of alternative methods of pain control, such as neurolytic blocks and intraspinal pumps.

Management of specific adverse effects is detailed in Table 4. The reader also is referred to a systematic review of opioid side effects by McNicol et al¹⁹ for a more detailed discussion.

Table 4. Management of Opioid Side Effects

Adverse Effect	Tolerance	Management
Constipation	No	– Stimulant (senna) plus stool softener (colace) usually used prophylactically
Nausea/vomiting	Often	– Consider giving a prescription for an antiemetic (eg, prochlorperazine 5 mg Q 6 h PRN) with new opioid prescriptions in case nausea develops. – Can treat prior to opioid doses or switch to another opioid.
Sedation	Develops rapidly	– May actually represent “catch-up” sleep if the patient had a sleep deficit due to previously uncontrolled pain and poor sleep. – Some patients, particularly with more advanced disease, need to achieve balance between sedation and pain control based on patients’ preferences. – Stimulants may be helpful in some cases (eg, methylphenidate 5–10 mg in the morning and at noon).
Delirium	No	– Often patients will be able to tolerate a different opioid. – If delirium is not directly related to administration of a new opioid, evaluate whether other or multiple causes related to advanced illness may be the cause.
Respiratory depression		– Does not occur if opioids are used judiciously. If this is a potential concern, start at a lower dose. – Sedation will occur before respiratory depression.
Urinary retention, itching, and rashes		– Can often be managed by switching to another opioid.

Opioid respiratory depression is rare when opioids are titrated appropriately. Risk factors for respiratory depression include: opioid naïveté; sleep apnea; obesity; renal insufficiency; any condition that interferes with ventilation; additional effects of other sedating agents, such as benzodiazepines; cachexia; or improper titration of opioids. Monitoring of sedation level is the most reliable way of preventing respiratory depression. Excess sedation always precedes significant respiratory depression. Respiratory rate alone is not sufficient to diagnose respiratory depression because depression is associated with decreased respiratory rate (<6 breaths/minute), hypoventilation, and a rise in PaCO₂. Because supplemental oxygen can easily correct hypoxia secondary to hypoventilation, pulse oximetry may be normal in the presence of significant respiratory depression. Respiratory depression should be suspected in the presence of decreased level of consciousness, respiratory rate less than 6 breaths per minute, myoclonic twitching, constricted pupils, skeletal muscle flaccidity, and cold/clammy skin.

If a patient is sedated but does not have respiratory depression, withholding the opioids, verbal and tactile stimulation, and careful monitoring is appropriate until the patient becomes more alert. Opioids can then be restarted at 25% to 50% of the previous dose. If significant respiratory depression occurs, a dilute mixture of the opioid antagonist, naloxone, can be used to reverse respiratory depression. Dilute 1 ampule (0.4 mg) of naloxone in 9 mL of normal saline. Give 1 mL of this mixture (0.04 mg) IV every 2 to 5 minutes until respiratory depression, but not analgesia, is reversed. Repeating doses may be necessary because naloxone has a shorter half-life than most opioids. Avoid giving undiluted naloxone because it can precipitate acute withdrawal and the return of pain.

Section 3. Patient-Controlled Analgesia

Patient-controlled analgesia is best used in which of the following situations?

A. The patient is able to initiate bolus doses and has severe pain.

Correct! PCA allows patients control over how much pain medication they receive. It does require the ability to press the device to initiate bolus dose.

B. Nursing is too busy to give pain medications regularly.

Incorrect. Although a PCA pump does obviate the need for nursing to bring medication to the patient, it should not be the primary reason to use a PCA.

C. The patient has been on opioids previously.

Incorrect. PCA can be used with patients who are opioid naïve or opioid tolerant.

D. You do not have time to titrate pain medication.

Incorrect. Patients on a PCA will still need their pain needs assessed and the dosing titrated appropriately.

Patient-Controlled Analgesia

Patient-controlled analgesia allows patients to self-administer parenteral analgesics. Indications for a PCA pump include the patient who requires parenteral analgesia and has breakthrough pain that is not predictable and patients with severe pain that would benefit from rapid opioid titration. PCA provides patients with a sense of control over their pain. In the hospital, a PCA is relatively contraindicated in patients who do not have cognitive ability to use PCA or need parenteral opioids for less than 24 hours.

Patient-controlled analgesia devices have a drug reservoir and an infusion system. PCAs require 4 orders:

1. Demand dose or patient initiated dose
2. Delay interval: the interval between patient-initiated doses
3. Continuous infusion rate if used
4. Hour limit: the maximum amount of drug dispensed in 1 hour

Morphine, hydromorphone, fentanyl, and methadone are used and are delivered primarily intravenously and subcutaneously. Epidural, intrathecal, or intraventricular routes are employed and require involvement of specialists for line placement.

The dosage of medications is dependent on the medication used and whether the patient is opioid naïve. Table 5 outlines recommended starting doses and basal rates of commonly used medications.

Table 5. Common Starting Doses of Medication for PCA

Opioid-Naïve Patient:

- Use a low (1 mg morphine/h) or no basal rate until opioid requirements are known.
- Lockout period is drug specific and depends on the time it takes to reach maximum effect (usually 10–12 minutes).

Examples:

- Morphine: no basal rate, 1-mg demand dose, lockout 10 minutes
- Hydromorphone: no basal, 0.2-mg dose, lockout 10 minutes
- Fentanyl: no basal, 10–15- μ g dose, lockout 10 minutes

Opioid-Tolerant Patient:

- Basal rate may be used to cover prior analgesic requirements (use equianalgesic chart to calculate).
- Bolus dose is generally 25%–50% of hourly basal rate.
- Lockout period determined by the time the drug takes to reach peak effect (usually 10–12 minutes).

PCA = patient-controlled analgesia.

Titration of the PCA demand dose is done every 30 to 60 minutes, depending on pain relief. A basal rate can be added if a patient receives multiple demand doses and is not getting pain relief. The basal rate is calculated by adding the amount of medication received in a specific number of hours and dividing by the number of hours. For example, if a patient receives 32 mg of morphine over 8 hours, a basal rate of 4 mg per hour ($32 \text{ mg}/8 \text{ hours} = 4 \text{ mg/hour}$) can be started. A new demand dose is calculated at 50% of the hourly rate. In this example, that would be a demand dose of 2 mg of morphine (50% of 4 mg/hour). The delay interval remains the same.

When the opioids are dosed appropriately, the risk of overdose is low for patients pushing their own PCA button. The patient will fall asleep before serious signs of overdose occur. Doses of medications are recommendations and clinicians need to consider age, renal function, liver function, pulmonary function, comorbid illness, and other medications the patient is receiving. If in doubt, use a low continuous infusion rate and adjust the demand PCA dose every 30 to 60 minutes as needed. The continuous infusion rate should not be changed more frequently than every 8 hours.

Section 4. Opioid Conversion

Using Table 6, 300 mg/day of long acting oral morphine is equivalent to what dose rate of continuous IV morphine?

Table 6. Opioid Equianalgesic Doses

Oral, mg	Drug	Intravenous, mg
30	Morphine	10
20	Oxycodone	N/A
7.5	Hydromorphone	1.5
N/A	Fentanyl	0.1
200	Codeine	130
10	Methadone	5

A. 10 mg/h

Incorrect. This would be equal to 720 mg/day of oral morphine.

B. 8 mg/h

Incorrect. This would be equal to 575 mg/day of oral morphine

C. 6 mg/h

Incorrect. This would be equal to 430 mg/day of oral morphine

D. 4 mg/h

Correct! Using Table 6, 30 mg of oral morphine equals 10 mg of IV morphine.

Opioid Conversion

Opioids have different potency. The IV route is always more potent than the oral route. It is important to be able to switch between opioids and between routes of administration. Equianalgesic tables are used to calculate doses of the new opioid. Equianalgesic tables are approximations. There are several different tables available, and there are several Web-based and personal digital assistant-based programs that do the calculations. A Web-based opioid conversion program is available at <http://www.hopweb.org>. Table 6 is an example of an equianalgesic table.

To convert from one opioid to another, determine the total 24-hour dose of the current opioid. Then use the following equation (ratio) and the equianalgesic table to convert:

When switching between opioids, it is recommended to reduce the calculated 24-hour dose by 25% to 50% to get the new total 24-hour starting dose. Then divide the daily dose by the number of doses per day. Allow for breakthrough doses, which may need to be titrated up.

The 24-hour dose reduction does not need to be done if converting from oral to IV regimens of the same opioid. Divide the 24-hour starting dose by the number of doses per day. Typically it is every 4 hours dosing, therefore, you divide by 6 to get the scheduled dose. The rescue dose of the opioid is 10% to 25% of the total 24-hour dose given usually every 2 hours. The patient is monitored closely for improvement in pain, functional status, and side effects. The dose is adjusted based on the total amount of drug given and type of pain medication (short acting or long acting). Short-acting opioids are used for dose titration. Converting to and from methadone is complicated and should be done with the assistance of a pain or palliative care specialist or pharmacist.

Example: Mr Jones develops a pathological fracture. He is admitted to the hospital and will take nothing by mouth. He has been well controlled on morphine 60 mg twice a day with 15-mg immediate-release morphine 2 times a day. He will need to be converted to IV morphine. Total 24-hour dose of current opioid is 60 mg + 60 mg + 15 mg + 15 mg = 150 mg. The equianalgesic chart shows a 30-to-10 oral to IV equivalent for morphine. Using the equation:

You order a PCA of morphine at basal rate of 2 mg/h (morphine 50 mg IV/24 hours = 2 mg/h) with a demand dose of 1 mg of morphine with a lock out of every 10 minutes.

More details for calculating opioid conversions are available at American Medical Association clinical pearls at http://www.ama-cmeonline.com/pain_mgmt/ and the American Academy of Hospice and Palliative Medicine's Fast Facts at www.aahpm.org.

Section 5. Barriers to Pain Control

Mrs L is a 92-year-old woman with severe back pain due to a compression fracture from osteoporosis. She refuses to take any pain medication stronger than acetaminophen. Of the options below, the most appropriate way to address her reluctance to take pain medication would be:

A. Give her daughter suggestions of how to get her to take her pain medications.

Incorrect. The patient should be asked why she is refusing to take pain medications.

B. Give her a placebo to see if it helps.

Incorrect. Placebos are not ethical in the treatment of pain.

C. Ask if she has any fears of becoming addicted.

Correct! The patient should be asked why she is refusing to take pain medications. Concern over addiction is the most common barrier to taking pain medications.

D. Give her morphine, but do not tell her what it is.

Incorrect. Deceiving patients is not ethical in the treatment of pain.

Barriers to Pain Control

After adequate assessment for pain, there are still several potential barriers to appropriate pain management. These pitfalls include physician reluctance to prescribe pain medicines (particularly opioids), as well as nursing and caregiver reluctance to give pain medicines. Another common barrier to pain management is patient reluctance to take medicine for pain. Table 7 outlines some of these common barriers and potential solutions to each. Because several studies have shown that the fear of addiction is the most common concern regarding pain management in cancer and hospice settings, educating patients and caregivers on this topic is very important.²⁰

Table 7. Common Barriers to Pain Management Related to Patient and Family Beliefs and Attitudes

Barriers	Potential solutions
Fear of becoming addicted	Explain the difference between tolerance and addiction; palliative intent of opioids.
Fear that if they use pain medicine now, it won't be available later in their disease	Educate that there are not upper limits on opioids and if they lose their efficacy, doses can be increased.
Fear of adverse effects	Educate about tolerance to adverse effects, such as sedation, management of constipation, and availability of alternate opioids.
Fear that taking pain medications means their illness is getting worse	Address fears about progressive illness.
Do not like taking medications	Discuss how untreated pain can adversely affect their functioning, and discuss pain management in terms of functional goals.
Feel that pain is retribution by God for their sins, and therefore must be suffered	Address spiritual concerns. Consider involving a chaplain, pastoral services, or a social worker.
Fear of distracting from the care or cure of underlying disease	Discuss how the management of pain is part of the treatment plan and will not interfere with other treatment modalities.

Several educational tools about opioids for patients are available. Examples include the National Cancer Institute's, Important Facts About Cancer Pain Treatment, which is available at <http://www.nci.nih.gov/cancer-topics/paincontrol>, and the American Cancer Society's, Pain Control: A Guide for People with Cancer and Their Families, at http://www.cancer.org/docroot/MIT/content/MIT_7_2x_Pain_Control_A_Guide_for_People_with_Cancer_and_Their_Families.asp. Researchers have found significant variability of opinions and attitudes, thus an open-ended approach to inquiring about the reasons behind reluctance to take pain medications is essential. Questioning of patients (and family members) about potential barriers and good patient education has been demonstrated to improve pain management.

Section 6. Managing Opioid Therapy in Patients with Renal and Hepatic Disease

Mr T is a 63-year-old male with multiple myeloma. He presented with poor renal function. He underwent chemotherapy and did well. Three months ago, he developed lytic bone lesions. He was started on morphine for pain and more chemotherapy. Pain was well controlled with a pain rating of 2 out of 10. He was able to work. Over the past few days he has been increasingly somnolent with pinpoint pupils. His pain is still well controlled. Which of the following best explains his deterioration on the opioid?

A. The disease is progressing.

Incorrect. This would be unusual because he has been relatively well, and it has been a short time span.

B. There is another cause of his drowsiness, such as hypercalcemia.

Incorrect. Although hypercalcemia does cause drowsiness and is common in myeloma, this is not the most likely explanation.

C. He has mistakenly taken more than the usual dose.

Incorrect. This is not the most likely explanation.

D. He is not eliminating morphine as he was previously.

Correct! Worsening renal function has caused the accumulation of morphine-6-glucuronide, causing mental status changes.

Understand Dosage Adjustment in Renal and Liver Failure

Patients with renal and hepatic disease may require opioids for pain relief. Most opioids are metabolized in the liver and renally excreted. Impairment in either system can lead to problems, primarily with increased toxicity.

Table 8 outlines how drugs are metabolized and excreted, in addition to their use in renal and hepatic failure.^{21,22} There are guidelines for prescribing opioids in renal failure, but research is relatively limited, and there is no consensus.²³ Renal function can be estimated with creatinine clearance (CrCl). Measurements of CrCl can be estimated using the following equations:

Table 8. Use of Opioids in Renal and Liver Disease

Drug	Metabolites	Hepatic	Renal	Use in Renal Failure	Use in Dialysis	Use in Hepatic Failure
Morphine ^a	Morphine-6-glucuronide ^{b,c} Morphine-3-glucuronide Normorphine	Metabolized	Excreted	Do not use	Do not use	Use carefully Reduce dose
Hydromorphone	Hydromorphone-3-glucuronide ^d Dihydromorphone Dihydroisomorphine Hydromorphone-3-sulfate Norhydromorphone Nordihydroisomorphine	Metabolized	Excreted	Use carefully	Use carefully	Use carefully
Oxycodone	Oxymorphine Conjugated oxycodone	Metabolized	Excreted	Not enough data to comment	Not enough data to comment	Not enough data to comment
Codeine	Codeine-6-glucuronide Norcodeine Morphine Morphine-6-glucuronide ^{b,c} Morphine-3-glucuronide ^c Normorphine	Metabolized	Excreted	Do not use	Do not use	Use carefully, analgesic effect reduced because conversion to morphine important for analgesic effect
Fentanyl ^e	Norfentanyl Despropionylfentanyl Hydroxyfentanyl Norfentanyl	Metabolized	Excreted	Can be used	Can be used	Can be used
Methadone ^e	Pyrolidine Pyrroline	Metabolized	Small amount excreted	Can be used	Can be used	Use carefully in severe liver disease

a = removed by dialysis; b = analgesic activity; c = depresses the central nervous system; d = neuro-excitatory activity; e = not removed by dialysis.
Data from Dean²¹ and Tegeeder et al.²²

Estimates of liver function are more difficult. The extent of liver damage cannot be estimated using liver function tests. The international normalized ratio and serum albumin are the most sensitive indicators. Because opioids are metabolized by the liver, no opioid can be considered well tolerated in patients with hepatic disease.

Great care needs to be taken when prescribing and evaluating the effects of opioids in patients with renal and hepatic failure.